
Identification of E2/E3 ubiquitinating enzymes and caspase activity regulating *Drosophila* sensory neuron dendrite pruning.

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Public Summary:

Scientific Abstract:

Ubiquitin-proteasome system (UPS) is a multistep protein degradation machinery implicated in many diseases. In the nervous system, UPS regulates remodeling and degradation of neuronal processes and is linked to Wallerian axonal degeneration, though the ubiquitin ligases that confer substrate specificity remain unknown. Having shown previously that class IV dendritic arborization (C4da) sensory neurons in *Drosophila* undergo UPS-mediated dendritic pruning during metamorphosis, we conducted an E2/E3 ubiquitinating enzyme mutant screen, revealing that mutation in *ubcD1*, an E2 ubiquitin-conjugating enzyme, resulted in retention of C4da neuron dendrites during metamorphosis. Further, we found that UPS activation likely leads to *UbcD1*-mediated degradation of *DIAP1*, a caspase-antagonizing E3 ligase. This allows for local activation of the *Dronc* caspase, thereby preserving C4da neurons while severing their dendrites. Thus, in addition to uncovering E2/E3 ubiquitinating enzymes for dendrite pruning, this study provides a mechanistic link between UPS and the apoptotic machinery in regulating neuronal process remodeling.

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